

OVERVIEW OF INTERFEROMETRIC POINT SENSORS

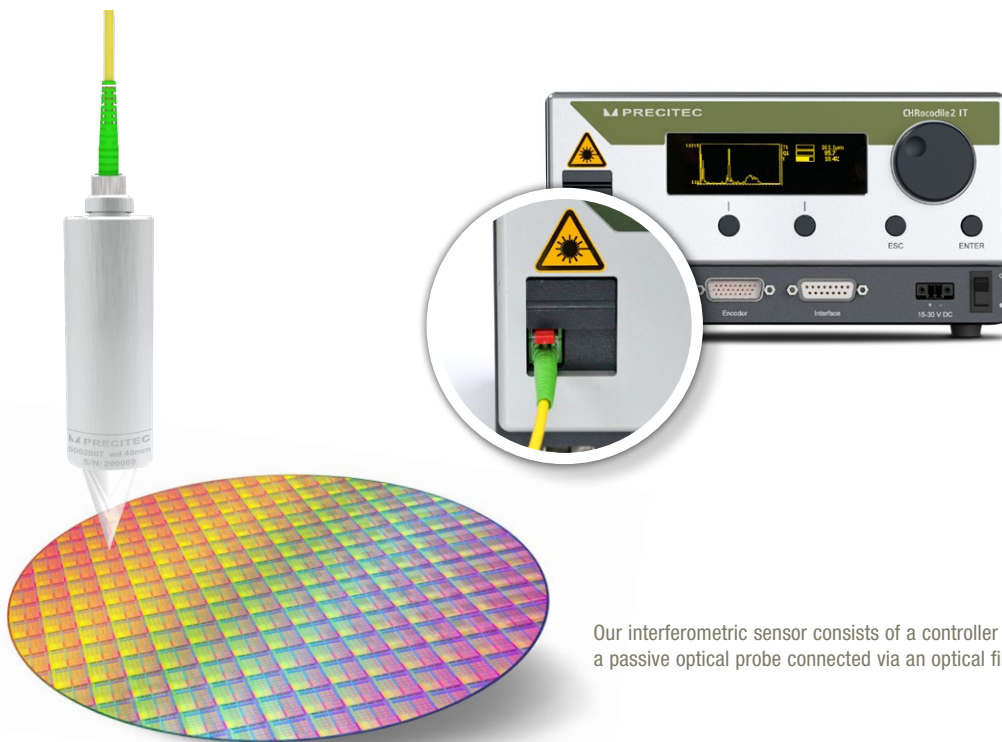
- ▶ Ultra-precise thickness measurements from $2\text{ }\mu\text{m}$ – $17,700\text{ }\mu\text{m}$
- ▶ Measurement of all infrared-transparent materials with rough, reflective or opaque surfaces
- ▶ Sensor technology suitable for harsh industrial environments, even for measurements in liquids such as water, oil or acids
- ▶ Insensitive to heat, humidity or vibration
- ▶ Ideal for high speed inline inspections up to 70 kHz

DISTANCE

THICKNESS

TOPOGRAPHY

ROUGHNESS



Our interferometric sensor consists of a controller and a passive optical probe connected via an optical fiber

WHY OUR INTERFEROMETRIC SENSORS STAND OUT

Our high-resolution coaxial interferometric point sensors enable non-contact distance and thickness measurements in a measuring range from 2 µm to 17,700 µm. Their nanometer resolution enables them to be also used for measuring microstructures, e.g. on wafers. Another advantage is that the thickness of multiple individual layers can be determined simultaneously in a single measurement.

This datasheet provides you with an overview of the best possible controller-probe combination to suit your specific application. If you require any further information, please do not hesitate to contact your Precitec sales contact.

OVERVIEW OF CONTROLLERS

CHRocodile Unit	Measuring rate (max)	Nominal Measuring range (min – max) ¹⁾	Extended range (max)	Axial resolution	Linearity (nominal)	Item number	Best suited for:
CHRocodile 2 S	70 kHz	2 µm – 180 µm	–	1 nm	0.2 µm	5103126	Thinnest layer, coatings, medium to ultra thin (Si) wafers. CHR 2 SX range designed for Si wafers up to 200 µm.
CHRocodile 2 SX	5 kHz	2 µm – 850 µm	1,400 µm	1 nm	0.2 µm	5104119	
CHRocodile 2 IT TW ²⁾	66 kHz	4 µm – 300 µm	500 µm	1 nm	0.2 µm	5105696	Thinnest layer, also behind opaque layer, in particular Si wafers.
CHRocodile 2 IT 400	66 kHz 40 kHz	29 µm – 3,000 µm	4,500 µm	1 nm	0.6 µm	5105975 5106179	Standard sensor for Si, SiC, InGaAs wafers and other common semicon materials. IT 1000 – 1700 series covers thickest wafers and multi layer structures.
CHRocodile 2 IT 500	66 kHz 40 kHz	38 µm – 3,900 µm	6,100 µm	1 nm	0.8 µm	5105980 5106180	
CHRocodile 2 IT 1000	66 kHz 40 kHz	66 µm – 7,000 µm	10,500 µm	2 nm	1.45 µm	5105982 5105470	
CHRocodile 2 IT 1300	66 kHz 40 kHz	87 µm – 8,800 µm	14,700 µm	3 nm	1.85 µm	5105200 5105971	
CHRocodile 2 IT 1700	66 kHz 40 kHz	114 µm – 11,000 µm	17,700 µm	4 nm	2.3 µm	5105986 5104574	
CHRocodile 2 IT RW 500	66 kHz 40 kHz	44 µm – 4,400 µm	6,900 µm	1.5 nm	0.9 µm	5105990 5105998	Rough surfaces and slightly scattering volumes.
CHRocodile 2 IT RW 1000	66 kHz 40 kHz	57 µm – 5,800 µm	9,000 µm	2 nm	1.2 µm	5105992 5105169	
CHRocodile 2 IT DW 250	70 kHz	15 µm – 1,500 µm	3,000 µm	1 nm	0.3 µm	5106183	Doped and highly doped wafers, multi-layer structures, measurements in liquids preferred tool for the FSS 310.
CHRocodile 2 IT DW 500	70 kHz	26 µm – 2,500 µm	5,000 µm	1 nm	0.5 µm	5106185	
CHRocodile 2 IT DW 1000	66 kHz 40 kHz	66 µm – 7,200 µm	10,700 µm	2 nm	1.4 µm	5105226 5106187	
CHRocodile 2 LR	70 kHz	16 µm – 1,900 µm	3,900 µm	1 nm	0.35 µm	5106181	Allrounder for optically transparent and semi-opaque materials.
CHRocodile 2 K	4 kHz	15 µm – 1,500 µm	2,250 µm	5 nm	1 µm	5103676	Plastics, blown films

OVERVIEW OF OPTICAL PROBES

	CHRocodile 2 TW, LR				CHRocodile 2 IT, RW, DW, K			
Working distance ³⁾		40 mm	100 mm	200 mm		40 mm	100 mm	200 mm
Lateral resolution	CHR 2 IT TW: CHR 2 IT LR:	30 µm 3 µm	75 µm 7.5 µm	15 µm 150 µm	CHR 2 IT: CHR 2 IT RW: CHR 2 IT DW/K:	5.5 µm 6.2 µm 3.7 µm	13 µm 15 µm 9 µm	26 µm 30 µm 18 µm
Measurement angle to surface ⁴⁾		±5°–85°	±2°–85°	±1.1°–85°		±5°–85°	±2.5°–85°	±1.2°–85°
Dimensions (without fiber connector)		l = 54 mm d = 15 mm	l = 56 mm d = 15 mm	l = 57 mm d = 15 mm		l = 48 mm d = 15 mm	l = 52.5 mm d = 15 mm	l = 49.5 mm d = 15 mm
Weight		57 g	62 g	63 g		52 g	57 g	50 g
Item number		5002807	5006420	5105812		5101549	5102340	5105659
Note	All probes enable thickness measurements, compatible accessories available for distance measurement							

THE EYES OF SMART INDUSTRY

It is no exaggeration to call interferometric sensors the “eyes of smart industry”. The data volume, speed and flexibility they offer in monitoring applications make them an invaluable assistant in smart manufacturing processes (aka industry 4.0). Since our interferometric measuring technology sees more, it really is a pioneering force in a wide variety of industrial applications.

By listening closely to what our customers tell us we can apply our R&D expertise to develop products that meet their precise needs. And by responding quickly to our customers’ needs, we can apply our R&D expertise to develop products of specific interest to a broad spectrum of industries. Our experience in the field of interferometry, for example, has resulted in developments such as our Flying Spot Scanner (FSS), an interferometric area probe.

The FSS 310 is point-of-interest area probe featuring a technology that is unmatched in the sensor industry. This was underlined at the highly acclaimed SPIE Prism Awards, which recognize “industrial innovation in physics” and awarded the Flying Spot Scanner 310 in the Test and Measurement category in February 2023.

Want to know what benefits installing an FSS 310 would bring or need any additional information? Just get in touch with us.



OVERVIEW OF OPTICAL PROBES

CHRocodile 2 S, SX ⁵⁾				CHRocodile 2 S	
Working distance ³⁾	40 mm	100 mm	200 mm	10.6 mm	18.1 mm
Lateral resolution	31 µm	65 µm	150 µm	6.5 µm	25 µm
Measurement angle to surface ⁴⁾	± 5°– 85°	± 2.5°– 85°	± 1.1°– 85°	± 10°– 85°	± 5°– 85°
Dimensions (without fiber connector)	l = 56 mm d = 15 mm	l = 56 mm d = 15 mm	l = 56 mm d = 15 mm	l = 67 mm d = 8 mm	l = 40 mm d = 8 mm
Weight	61 g	62 g	64 g	23 g	10 g
item number	5104329	5104330	5105833	5003517	5002947
Note				optical fiber fixed on probe	extra compact, optical fiber fixed on probe

¹⁾ Optical length | ²⁾ CHRocodile 2IT TW: light source - halogen lamp | ³⁾ Bottom of optical probe to focal plane | ⁴⁾ Decreasing accuracy for large incident angles. Low (high) number represents maximum slope angle on reflective (diffuse) surfaces | ⁵⁾ 2 separate spots for CHRocodile 2 SX

All interferometric CHRcodile units are equipped with one measuring channel and provide following technical specifications:

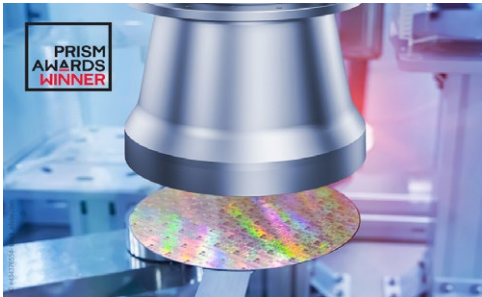
Synchronization with external devices	Trigger input, synchronizing output, 5 encoder inputs
Interface	Ethernet, EtherCAT [®] , RS-422, 2 x analog (-10 V to +10 V, 16 Bit)
Transfer rate	Ethernet (100 Mbit), EtherCAT [®] (100 Mbit), RS-422 (up to 10 MBaud)
Light source	SLD ²⁾ , LED (CHRcodile 2S/2SE), Diode-based (CHRcodile 2SX)
Operating temperature	+5°C up to +50°C
Dimension (width x height x depth)	220 mm x 110 mm x 135 mm
Weight	2 kg
Supply voltage	16 - 30 V DC (with separate power supply 90 - 264 V AC)
Rated power	20 W 30 W (CHRcodile 2 SX)

²⁾ CHRcodile 2IT TW: light source - halogen lamp | [®] EtherCAT[®] is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



Consumer Electronics

Inline quality control at high speed. Planarity inspection of glass surfaces, measurement of glass or coating thicknesses and step height and air gap analysis



Semiconductor

TTV, bow and warp in a single scan. Non-contact, non-destructive optical sensors quantify wafer thickness during workpiece treatment (CMP & grinding).



Glass

Glass tubes are used in the production of vials, ampoules and syringes, requiring precise control of wall thickness and roundness to meet stringent quality control and medical industry regulations. TTV, bow and warp in a single scan.



E-Mobility

Ensuring precise enamel coating thickness on copper hairpins is crucial to prevent short circuits and maintain high electrical properties. Inspections tasks include detecting cracks, monitoring laser-stripping, and ensuring damage-free coatings.

The given data was generated for a typical application and may be different given other circumstances. Furthermore misprints, changes and/or innovations may lead to differences in the listed measurements, technical data and features. All information is therefore non-binding and technical data, measurements and features are not guaranteed.

Precitec 3D Metrology - measure more precisely with light